

Is restenosis a benign event?

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Conflict of interest

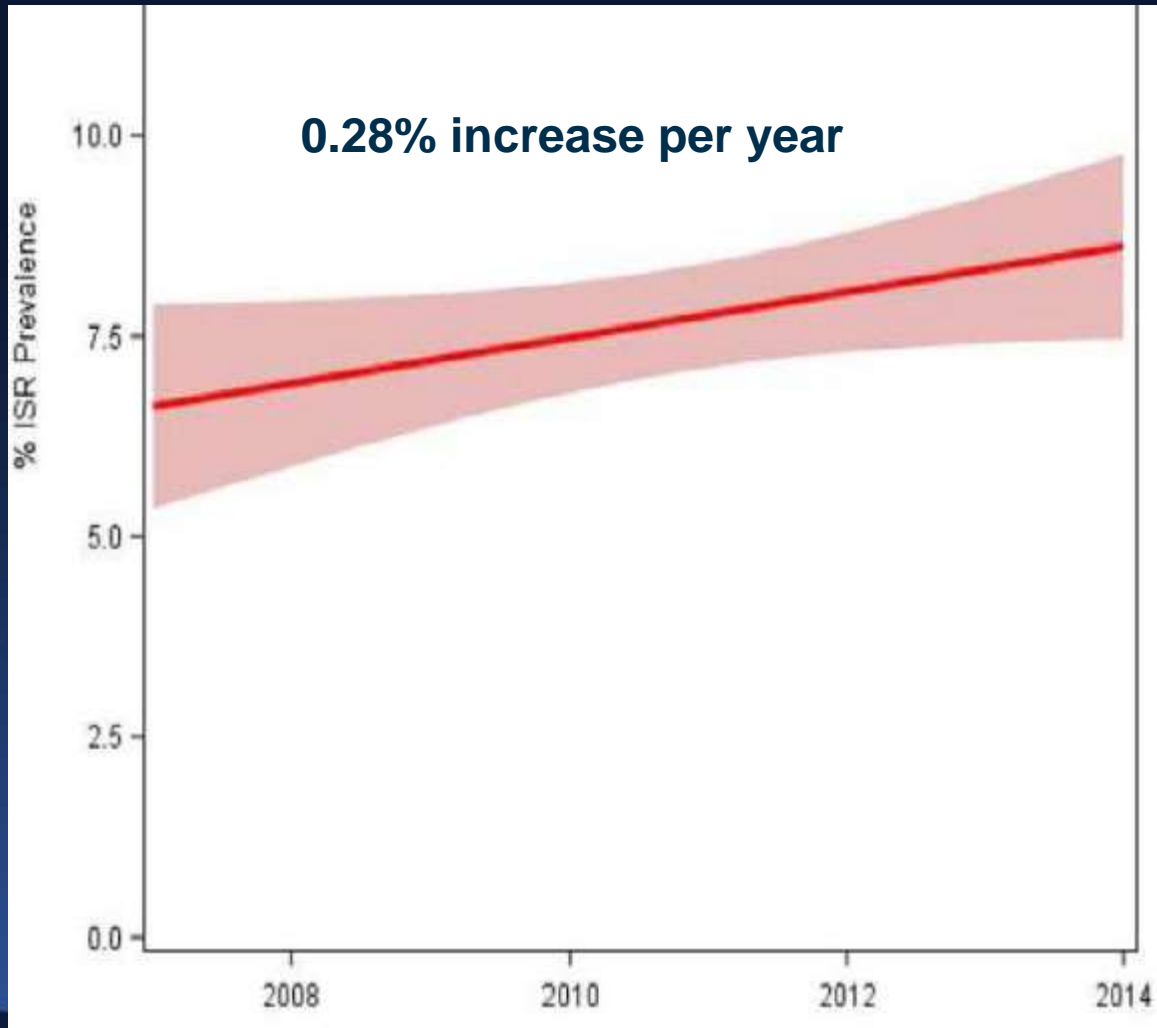
- **None**

In-stent restenosis: conception or misconception?

- 1) ISR usually presents with SIHD
- 2) ISR is not associated with MACE at fup
- 3) Rates of repeat revascularization for ISR declining
- 4) We need ISR in clinical trials to increase the number of expected events and lower the sample size



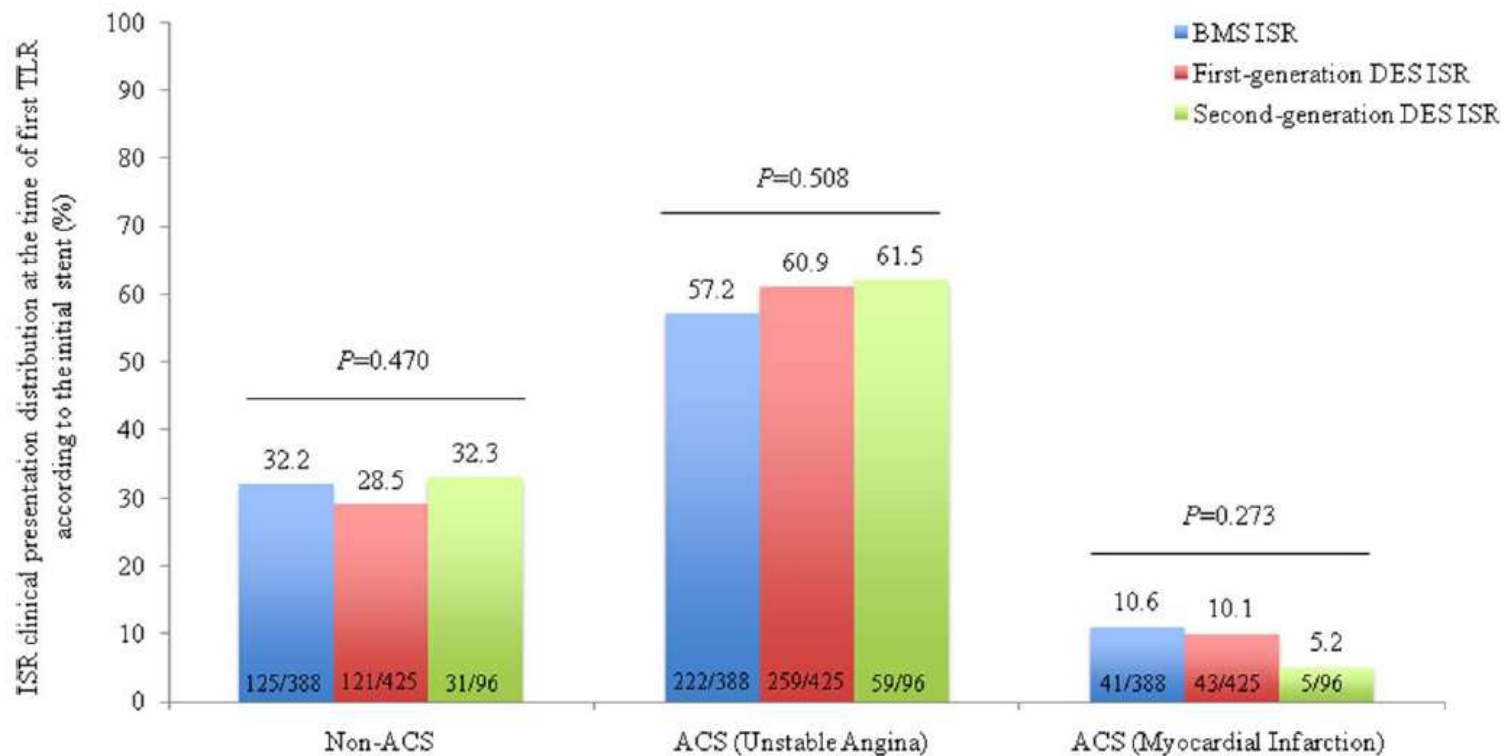
Proportion of patients undergoing revascularization for restenosis



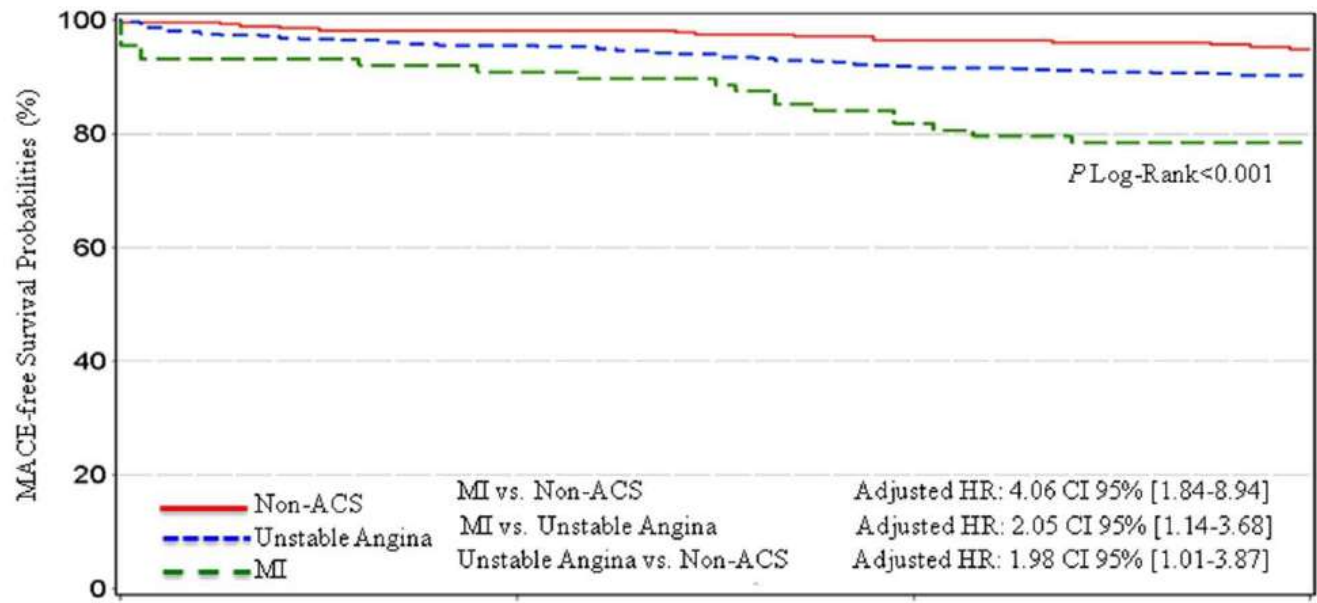
National VA Program
65,443 patients
6,872 revsc for restenosis

Clinical Presentation and Outcomes of Coronary In-Stent Restenosis Across 3-Stent Generations

Marco A. Magalhaes, MD; Sa'ar Minha, MD; Fang Chen, PhD; Rebecca Torguson, MPH;
Al Fazir Omar, MD; Joshua P. Loh, MBBS; Ricardo O. Escarcega, MD;
Michael J. Lipinski, MD, PhD; Nevin C. Baker, DO; Hironori Kitabata, MD, PhD;
Hideaki Ota, MD; William O. Suddath, MD; Lowell F. Satler, MD; Augusto D. Pichard, MD;
Ron Waksman, MD *Circ Cv Int* 2014



MACE according to ISR clinical presentation



n at risk
(All patients)

Non-ACS

Unstable Angina

MI

Total

0

277

540

88

905

2

272

516

80

868

Survival time (months)

4

267

496

72

835

6

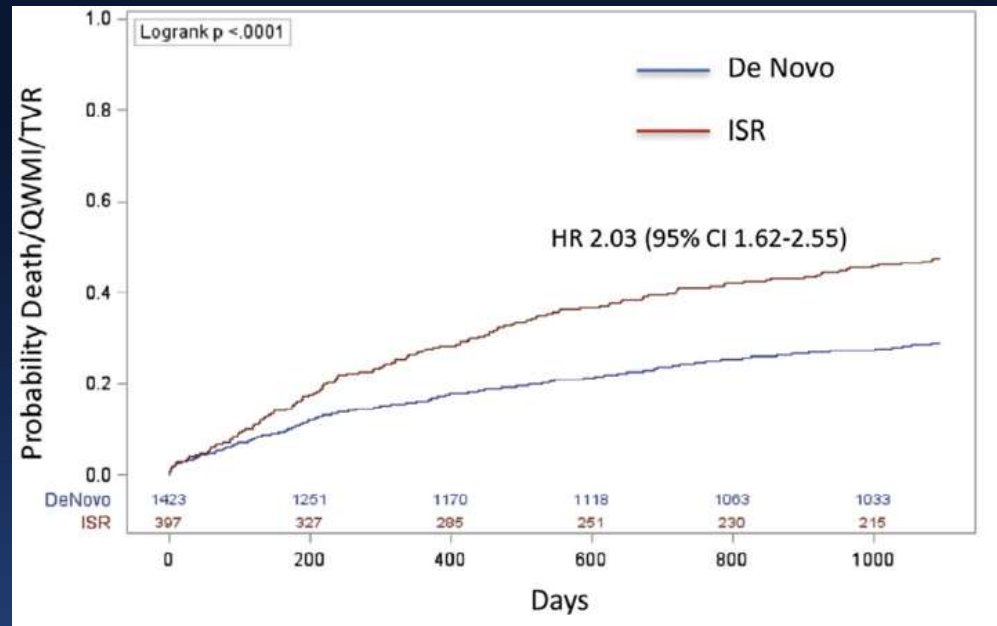
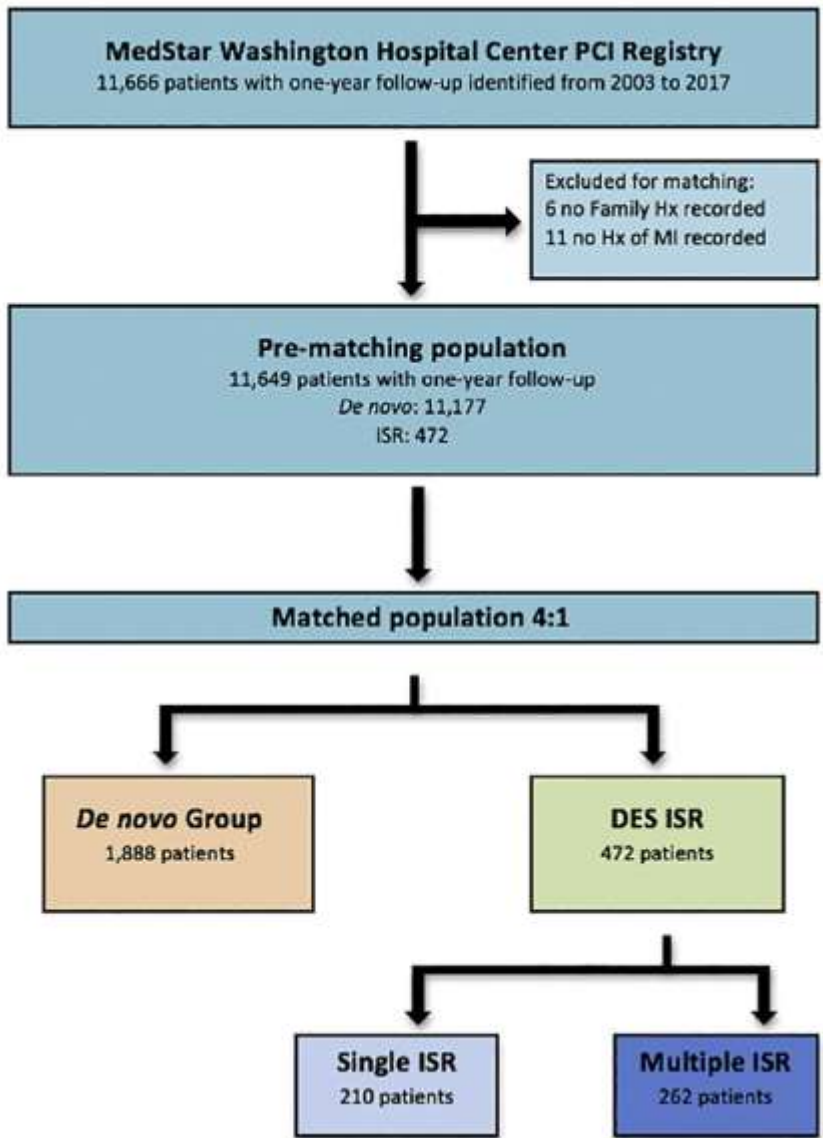
253

479

67

799

ISR versus de novo lesions

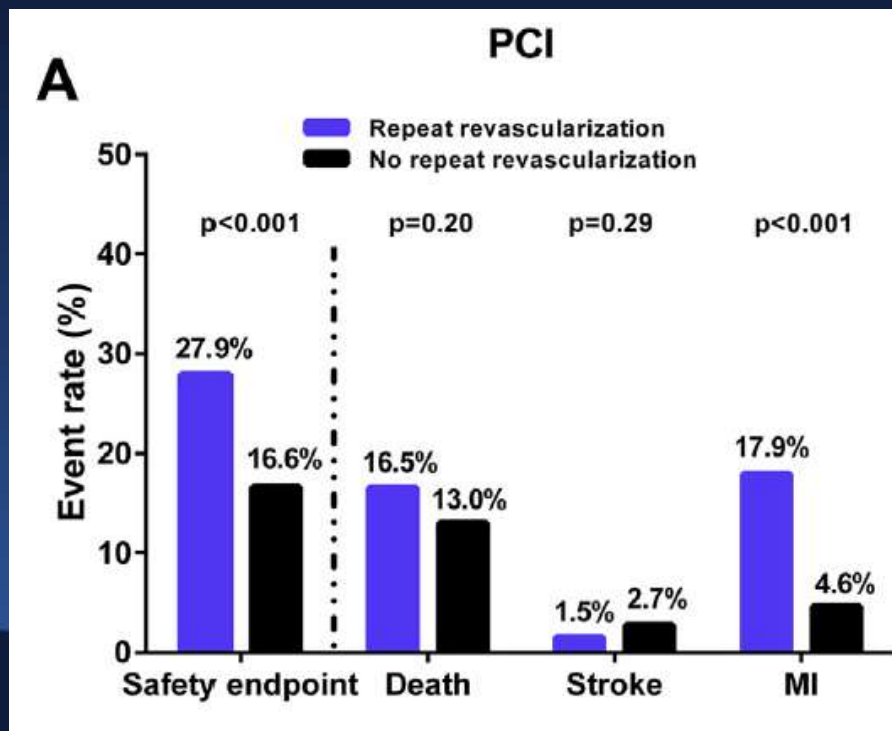


Incidence, Characteristics, Predictors, and Outcomes of Repeat Revascularization After Percutaneous Coronary Intervention and Coronary Artery Bypass Grafting

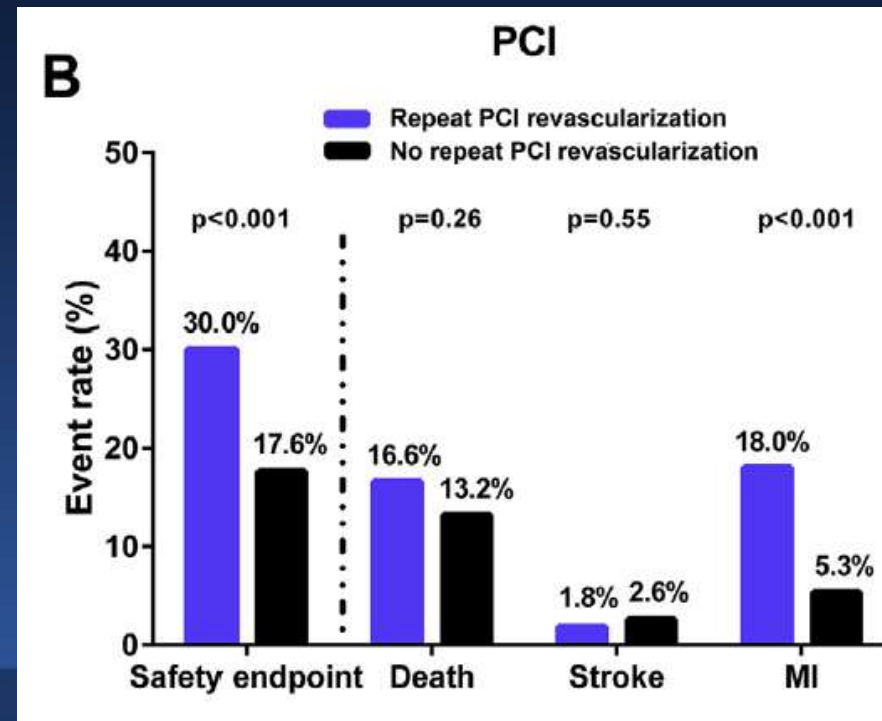
The SYNTAX Trial at 5 Years

Parasca et al; JACC Int 2016

Any repeat revascularization



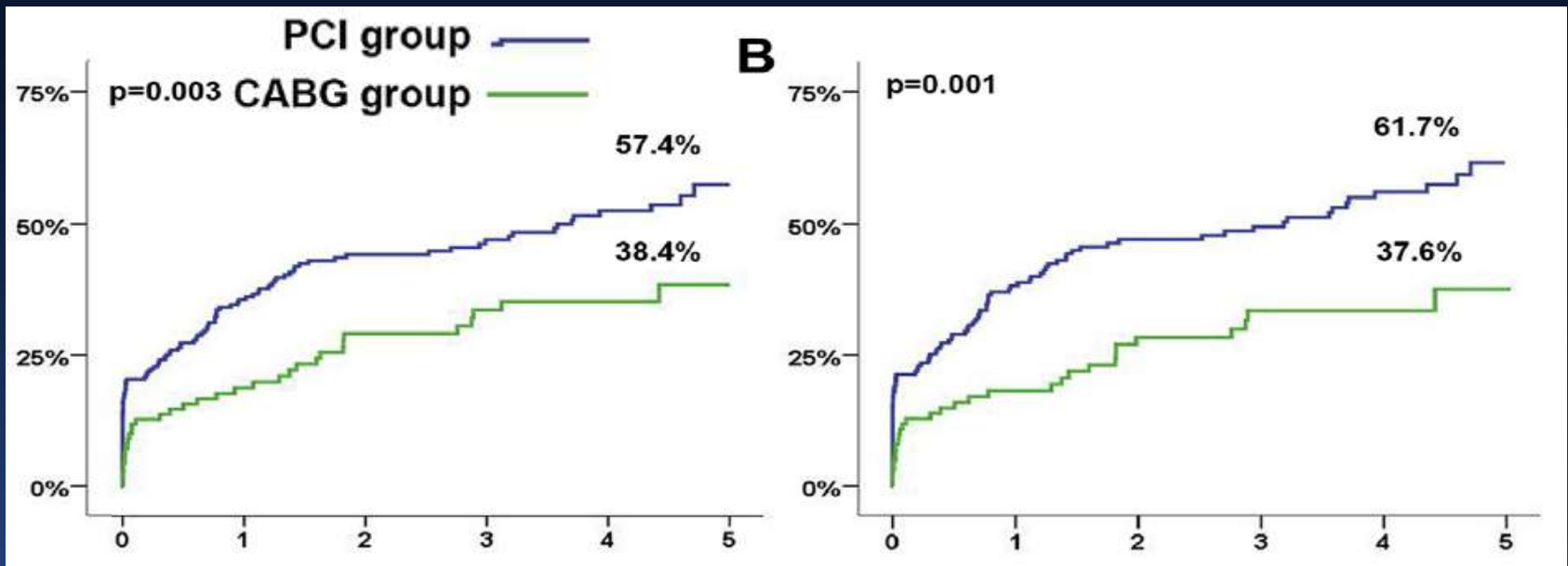
Repeat PCI revascularization



Death, stroke or MI

Any repeat revascularization

Repeat PCI revascularization



What is known

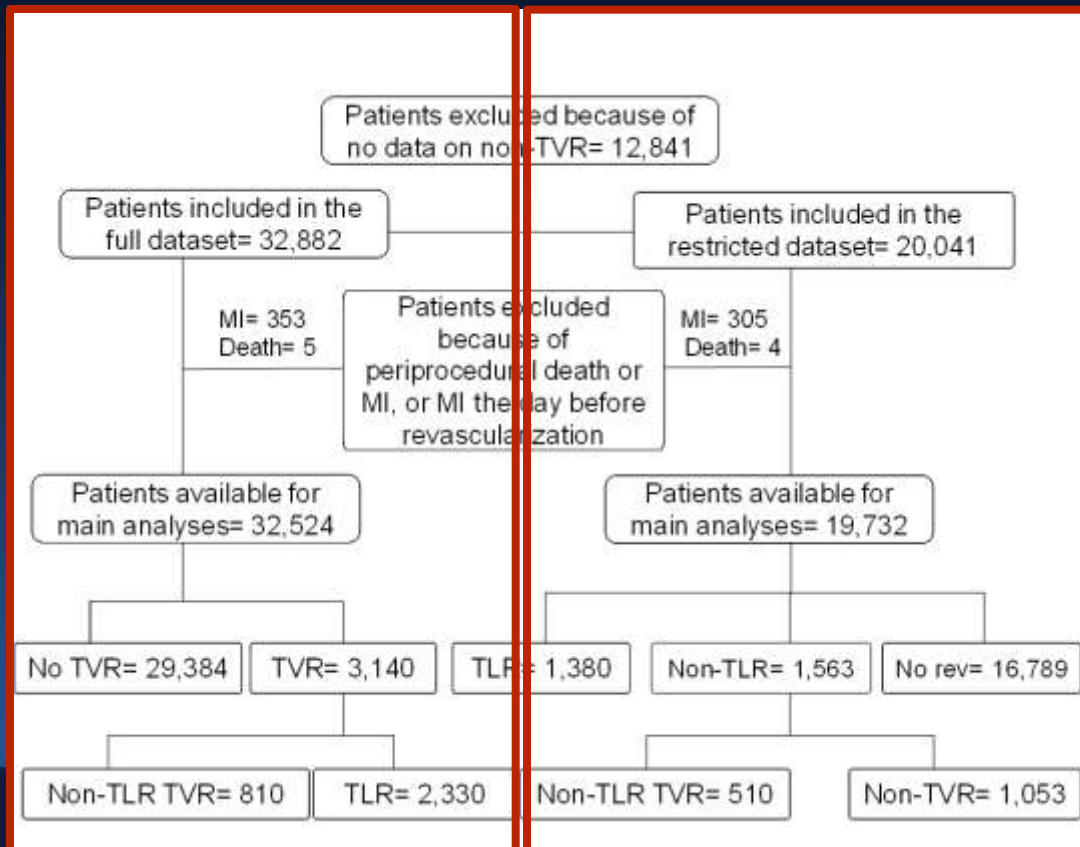
- 1) ISR may present with ACS or MI
- 2) Clinical presentation of ISR has a relevant clinical impact
- 3) ISR has a worse outcome than de novo lesions
- 4) TLR is associated with increased rates of death MI, or stroke compared to patients with no repeat revasc

What is not known

- 1) Prognostic implication of ISR not associated with ACS
- 2) Prognostic implication of uncomplicated repeat revasc
- 3) Prognostic implication of different type of repeat revasc
- 4) Association with mortality?

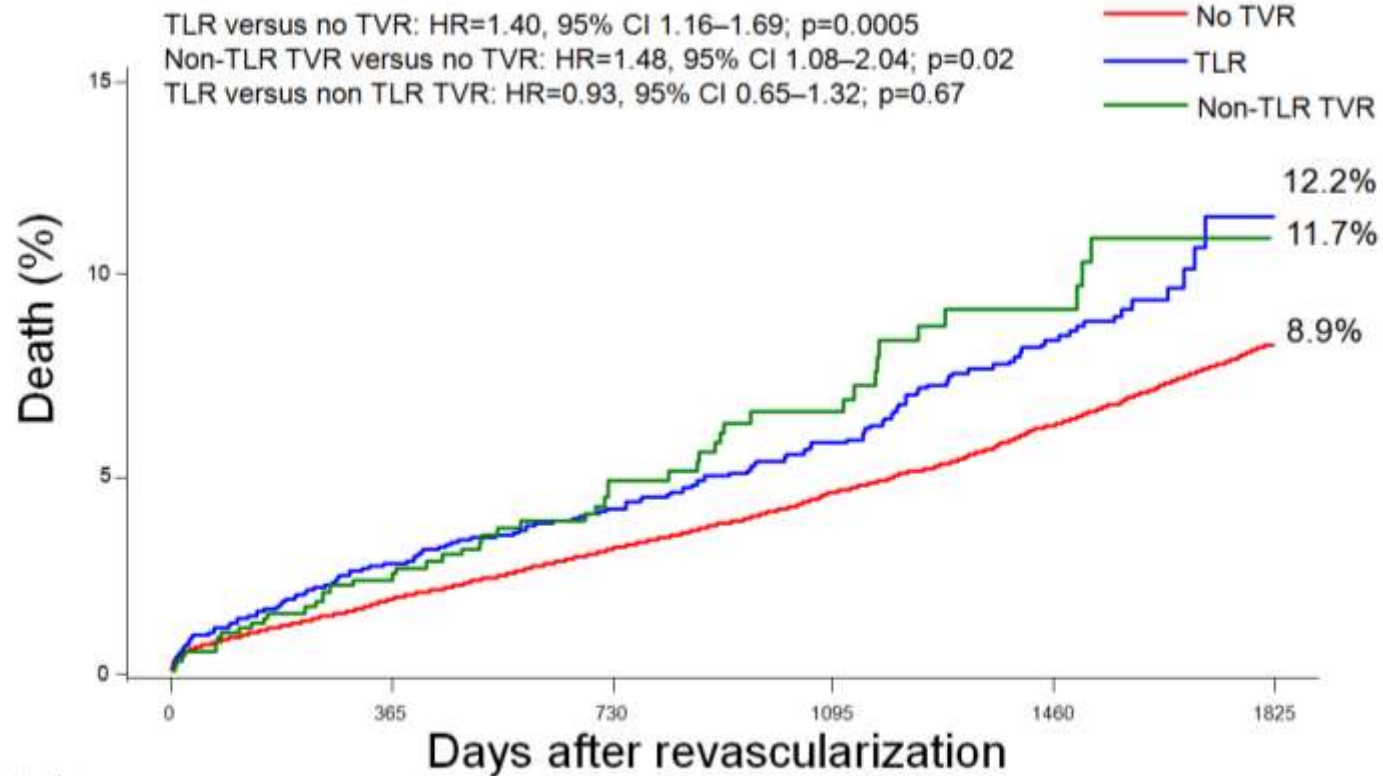
Mortality Following Non-emergent, Uncomplicated Target Lesion Revascularization After PCI: An Individual Patient Data Pooled Analysis of 21 Randomized Trials and 32,524 Patients

Tullio Palmerini, Diego Della Riva, Giuseppe Biondi-Zoccai, Martin B. Leon, Patrick W. Serruys, Pieter C. Smits, Clemens von Birgelen, Ori Ben-Yehuda, Philippe Généreux, Antonio G. Bruno, Paul Jenkins, Gregg W. Stone



JACC Int 2018; in press

Simon Makuch analysis of mortality



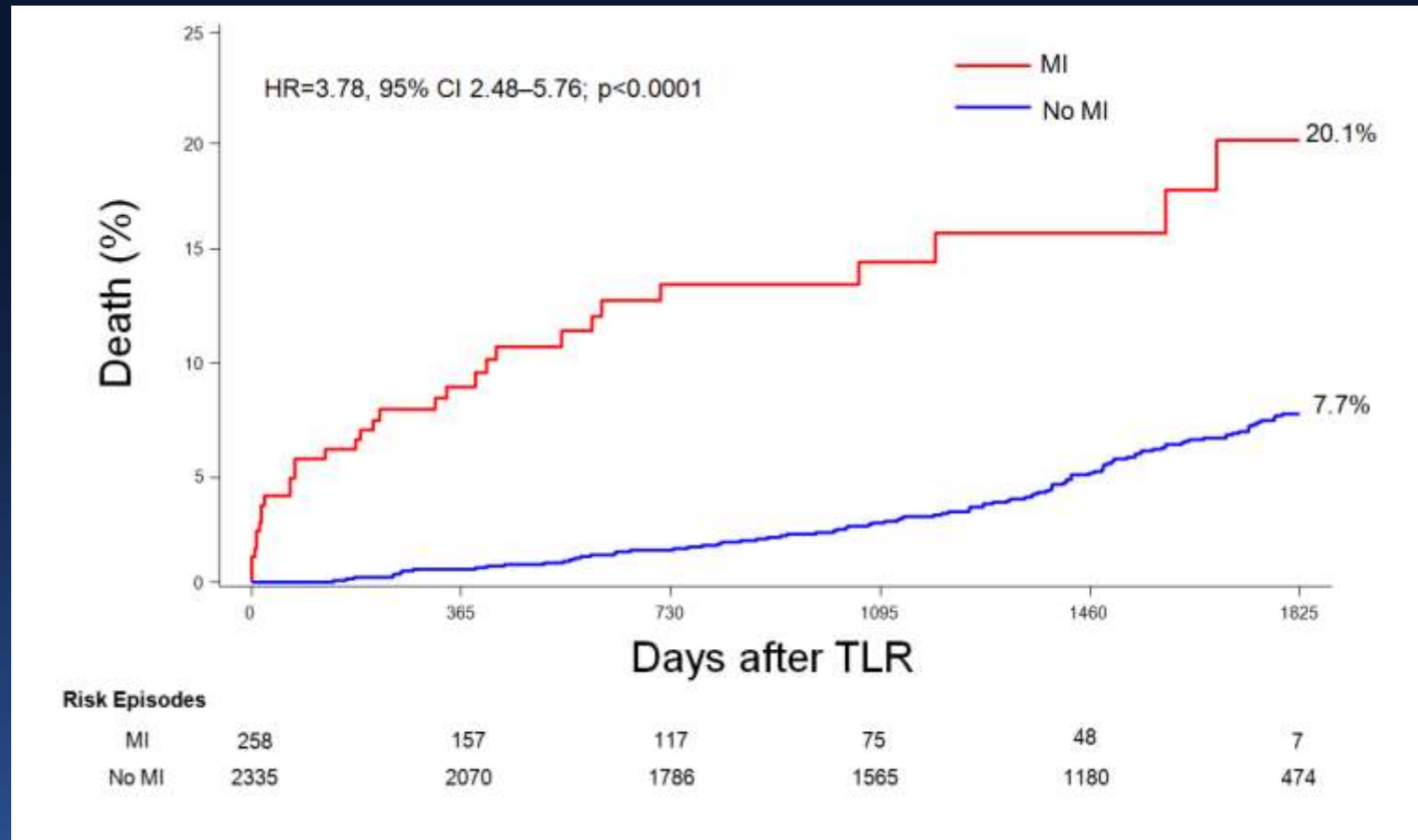
Risk Episodes

No TVR	32524	27149	21641	17648	11543	4948
TLR	2330	1686	1324	987	768	1
Non-TLR TVR	810	600	426	260	157	0

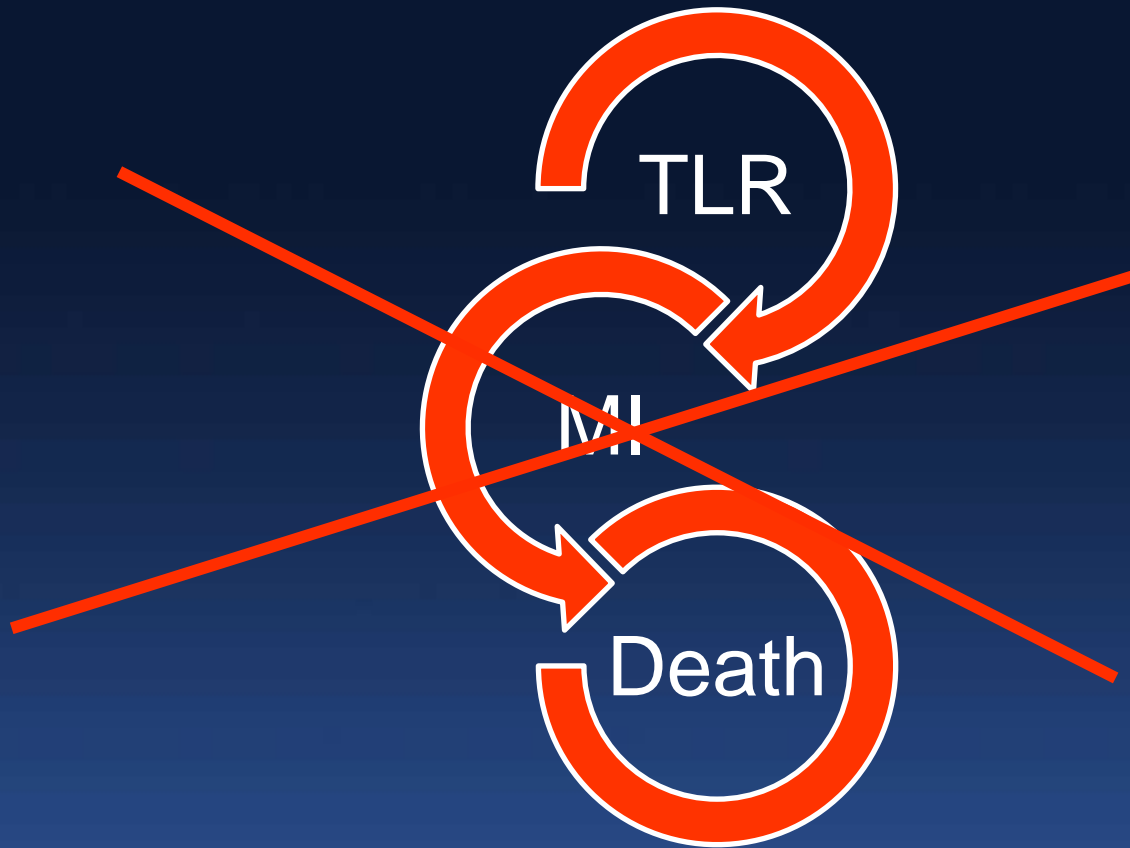
Independent predictors of mortality

	HR (95% CI)	P value
TLR	1.23 (1.04-1.45)	0.02
Non-TLR TVR	1.23 (0.83-1.82)	0.31
MI or ST during fup	4.26 (3.16-5.74)	<0.0001
Age (per 1 year)	1.07 (1.07-1.08)	<0.0001
Diabetes	1.60 (1.46-1.76)	<0.0001
Male sex	1.16 (1.08-1.25)	<0.0001
Previous CABG	1.35 (1.21-1.52)	<0.0001
Previous MI	1.32 (1.23-1.40)	<0.0001
Presentation with MI	1.47 (1.23-1.75)	<0.0001
<i>Palmerini et al; JACC Int 2018 in press</i>		

Mortality after TLR in patients with vs without MI

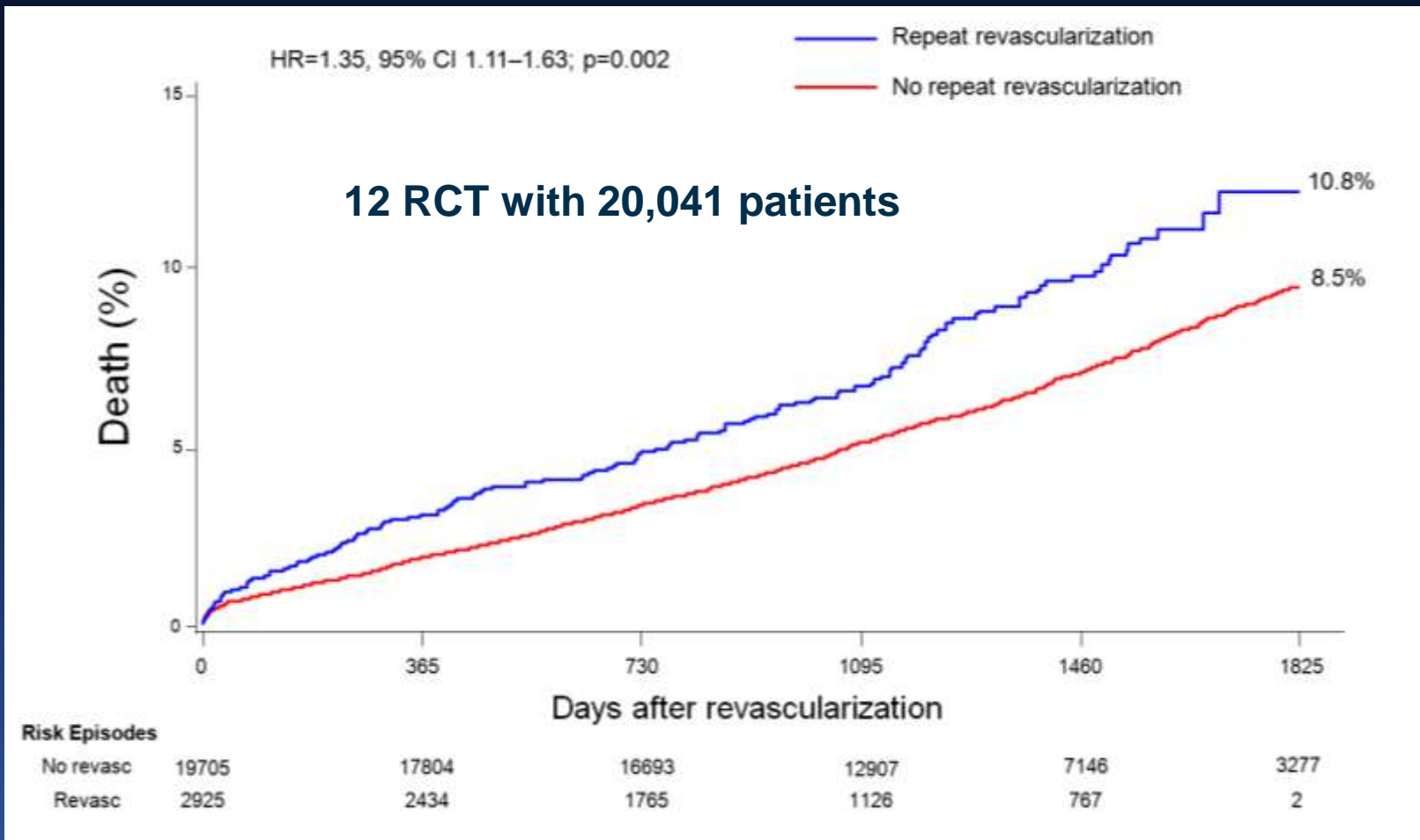


TLR-MI-Death: a mechanistic link?

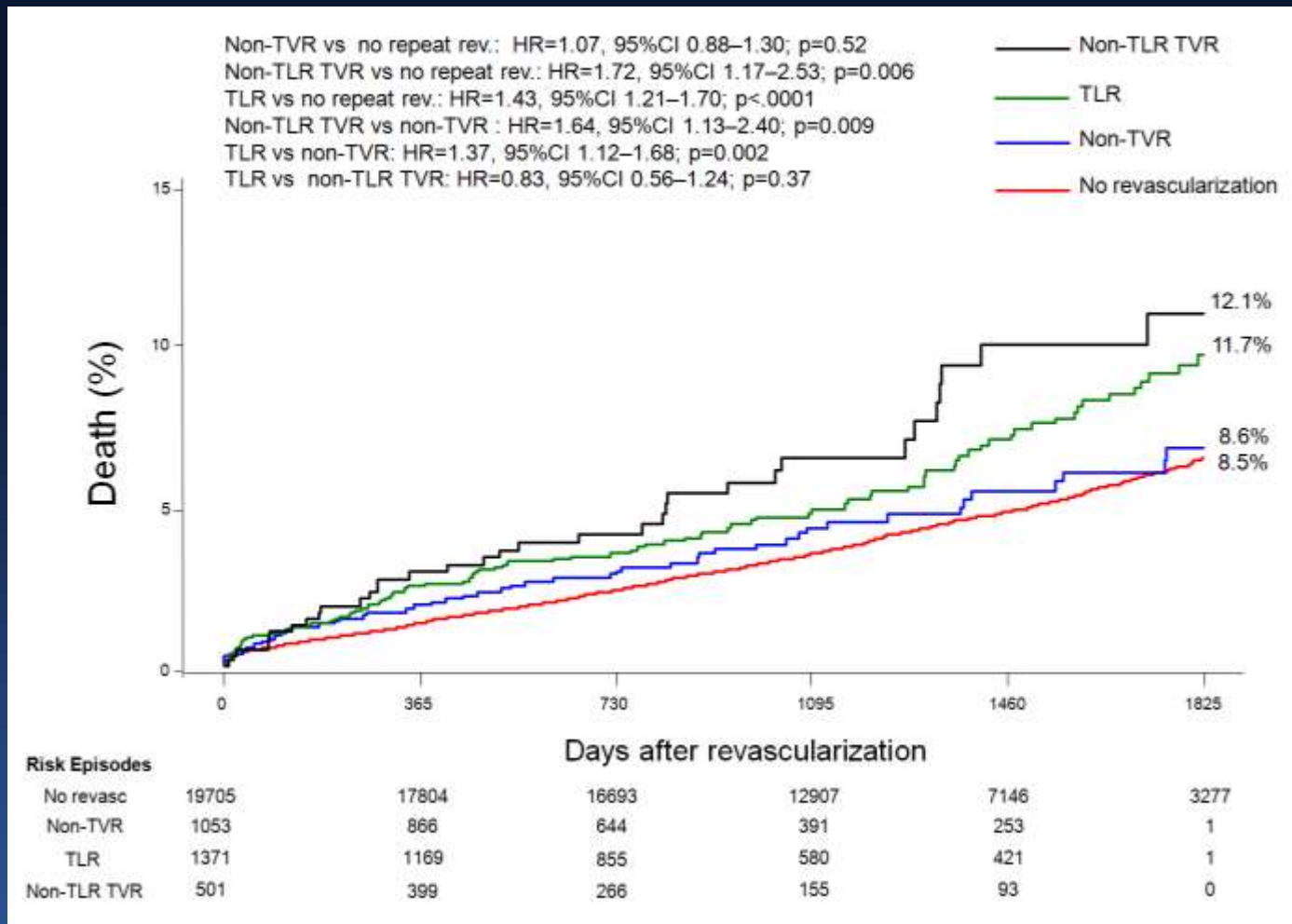


HR=1.25, 95% CI 1.04-1.50, p=0.02

Mortality in patients with versus without any repeat revascularization



Mortality according to the type of repeat revascularization



Independent predictors of mortality

	HR (95% CI)	P value
TLR	1.33 (1.08-1.64)	0.02
Non-TLR	1.18 (0.90-1.55)	0.18
MI or ST	3.26 (2.27-4.68)	<0.0001
Age (per 1 year)	1.08 (1.07-1.08)	<0.0001
Diabetes	1.50 (1.39-1.61)	<0.0001
Male sex	1.20 (1.12-1.29)	<0.0001
Previous CABG	1.36 (1.19-1.56)	<0.0001
Previous MI	1.33 (1.23-1.44)	<0.0001
Presentation with MI	1.40 (1.12-1.75)	0.003
<i>Palmerini et al; JACC Int 2018 in press</i>		

Conclusions

- Although DES have significantly reduce the risk of restenosis compared with BMS, repeat revascularization procedure for restenosis in the last 10 years have not declined.
- In contrast to common perception, restenosis and TLR are not benign entities as they may be associated with increased rates of mortality.
- Reducing restenosis and TLR rates may therefore translate in better survival after percutaneous coronary revascularization.